

RESEARCH DEPARTMENT

**TRANSMITTING AERIALS FOR THE LARNE V.H.F. TELEVISION
AND V.H.F. SOUND STATION**

Technological Report No. E-114/6

(1965/16)

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for Head of Research Department

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TRANSMITTING AERIALS FOR THE LARNE V.H.F. TELEVISION AND V.H.F. SOUND STATION

INTRODUCTION

The Larne relay station came into operation on 5th April 1965. It provides a television and v.h.f. sound service to Larne; the television coverage also extends to Ballylumford and Magheramorne.

SUMMARY OF INSTALLATION

Site: The site is at Tappagh, 0.5 miles (0.8 km) north of Larne, grid reference D/395 037, height 390 ft (88 m) a.m.s.l.

Support Structure: The support structure consists of a 120 ft (37 m) square-section self-supporting tower oriented with one side on a bearing of 20° ETN.

General Arrangement: See Fig. 1.

Band I

Channel: Channel 3, with horizontal polarization is used. Both vision and sound carriers are offset -16.875 kc/s.

Aerial: The aerial¹ is a single tier consisting of two horizontal dipoles mounted on bearings of 135° and 210° ETN, spaced 6 ft 11 in. (2.11 m) from the support tower axis and fed with equal co-phased currents. Horizontal screening consisting of 1 in. (2.54 cm) diameter rods spaced 1 ft 6 in. (0.46 m) apart extends 0.5λ above and below the dipole level on all faces of the tower. The aerial is 62 ft (19 m) a.g.l. at which height the tower side dimension is 4 ft 6 in. (1.37 m).

Power: A 100 W translator-amplifier under-run at 42 W is used.

Templet and horizontal radiation pattern (h.r.p.):

See Fig. 2 and Note 1.

Gain:	Mean intrinsic and net gain	-1.6 dB
	<u>Deduct:</u> loss in main feeder (type RPC 2603) 1.0 dB	
	network loss	<u>0.6 dB</u> <u>1.6 dB</u>

Band II

Carrier Frequencies: 89.1 (Light), 91.3 (Third), 93.5 (Northern Irish Home) Mc/s.

Aerial: The aerial¹ consists of two tiers each of two horizontal dipoles mounted on bearings of 125° and 215° ETN, spaced 3 ft 10 in. (1.17 m) from the support tower axis and fed with equal co-phased currents. The inter-tier spacing is 0.7λ and the mean height 111 ft (34 m) a.g.l. There are independent main feeders to each tier.

Power: A 10 W translator is used for each programme.

Templet and h.r.p.: See Fig. 3 and Note 2.

Gain:	Mean intrinsic gain	1.8 dB
	<u>Deduct:</u> losses due to distribution feeders and possible misalignment	<u>0.2 dB</u>
	Mean net gain	1.6 dB
	<u>Deduct:</u> loss in main feeder (type RPC 2603) 1.6 dB	
	network loss	<u>0.9 dB</u> <u>2.5 dB</u>

Mean effective gain -0.9 dB

Programme Links: Both television and sound programmes are obtained by direct reception of the transmissions from Divis. Protection against corona interference with television reception is given by the spike and parasitic reflectors which surmount the aerial support tower.

Notes:

1. The aerial design was based on a theoretical prediction of the h.r.p. in which the main approximation was that re-radiation from the dipole support booms was neglected. This was not, however, expected to lead to serious errors and an experimental check of the h.r.p. was not carried out.
2. The aerial design was based on a theoretical h.r.p. of the dipoles alone neglecting the effects of re-radiation from the support mast and the dipole support booms. A more

accurate h.r.p., which included the effect of the support booms, was obtained from measurements on a small-scale model mounted on a thin support pole. This was a reasonable approximation to the full-scale aerial in view of the small electrical size of the tower cross section (0.079λ square) and the absence of horizontal screening bars.

REFERENCE

1. Detailed information on the construction and dimensions of the aerials is given on the following drawings held by BBC Planning and Installation Department.

P.I.D. 9034.2.1A General Arrangement of Aerials on 120 ft Tower

P.I.D. 9034.2.2K General Arrangement of Band I Transmitting Aerial

P.I.D. 9034.2.3H Band I Balum Sub-assembly

P.I.D. 9034.2.4H Band II Balum Head Detail

P.I.D. 9034.2.5H Band II Balum Sub-assembly

P.I.D. 9034.2.6J Band II Dipole Arm Details

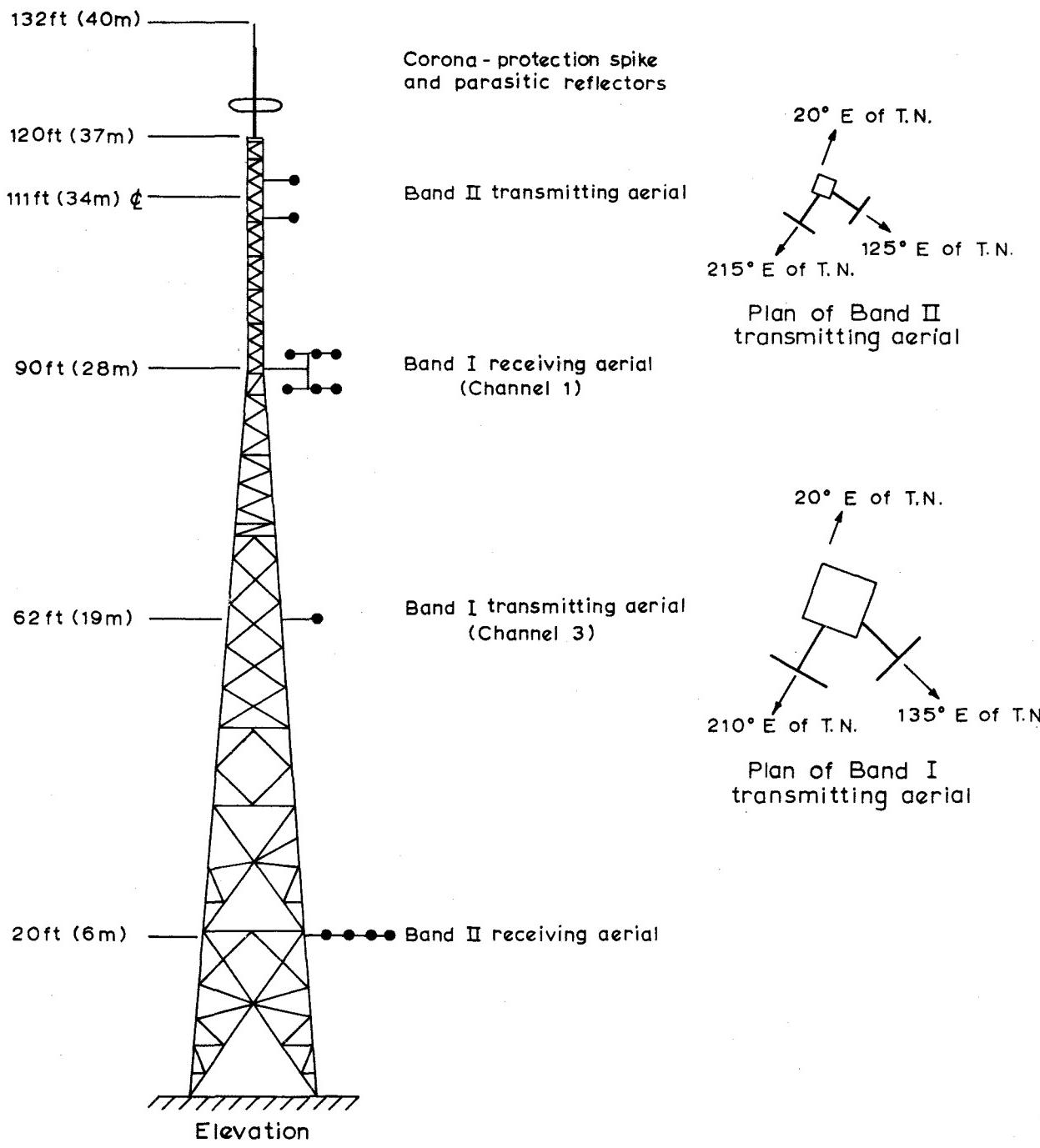
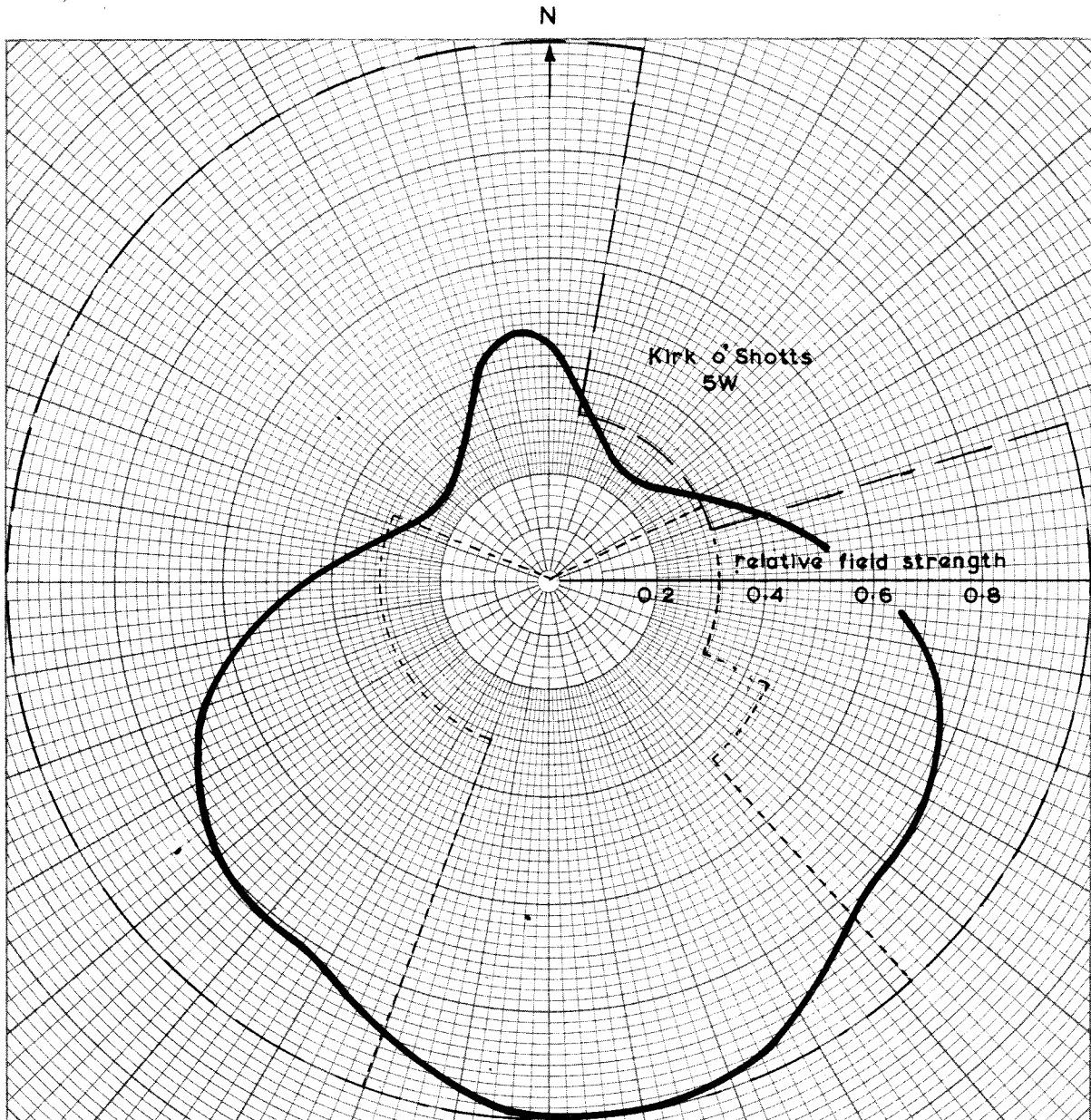


Fig. 1. General arrangement of aerials on tower



**Fig. 2 Band I templet and horizontal radiation pattern
HORIZONTAL POLARIZATION**

Channel 3 (Vision carrier 56.75Mc/s, Sound carrier 53.25Mc/s)
 Mean effective gain -3.2dB ——— Maximum permissible E.R.P.
 Transmitter power 42W ----- Minimum desirable E.R.P.
 Mean E.R.P. 20W
 Unit field corresponds to an E.R.P. of 50W

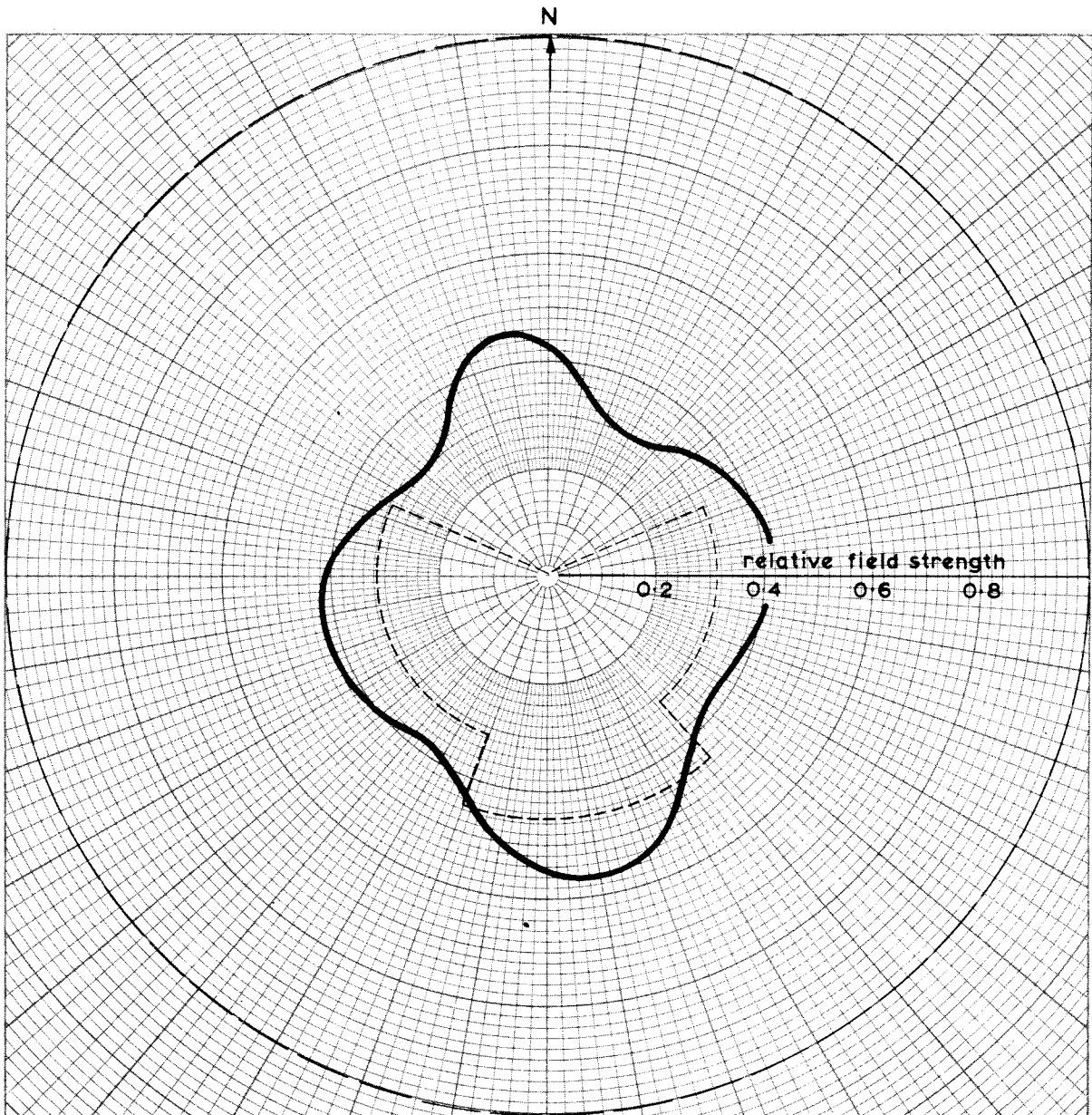


Fig. 3. Band II templet and horizontal radiation pattern.

HORIZONTAL POLARIZATION

89.1 (Light), 91.3 (Third), 93.5 (Northern Irish Home), Mc/s

Mean effective gain -0.9dB ——— Maximum permissible E.R.P.
 Transmitter power 10W ----- Minimum desirable E.R.P.
 Mean E.R.P. 8.1W

Unit field corresponds to an E.R.P. of 50W